

A quick-release crampon consists of a spiked sole plate (2) and heel plate (3) which are connected by a link bar (4). The sole plate (2) has a toe bar (6) which engages the toe portion of a climbing boot. The heel plate (3) has a heel clamp (7) which engages the heel portion of a boot. The locking mechanism of the crampon comprises a lever (10) pivotally connected to the sole plate (2) and eccentric engaging means for engaging the heel plate (3). The eccentric engaging means comprises a linking member (4) pivotally connected at one end (11) to the lever (10) and at the other end (13) to the heel plate (3). The linking member (4) is adjustable so that the same crampon (1) may be used with boots of different length. The front teeth of the crampon are T-shaped in cross section and comprise a planar V-shaped flange portion (19) and a perpendicular web portion (20) with serrations (21).

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1 **Quick-Release Ice Crampon**

2

3 This invention relates to crampons for mounting on
4 climbing boots to enable boots to be used in climbing
5 on ice and packed snow. In particular the invention
6 relates to quick-release crampons which can be easily
7 secured to and released from the soles of climbing
8 boots.

9

10 Prior art crampons are generally made from pressed mild
11 steel. A flat sheet of steel is cut to shape by
12 stamping or other cutting process. The teeth of the
13 crampon are formed by bending projecting parts of the
14 mild steel plate through 90°. The crampons are
15 attached to the boots by one or more straps.

16

17 Prior art crampons have the following disadvantages:

- 18 - the mild steel teeth do not perform well at sub-zero
19 temperatures and may snap off when high loads are
20 applied to them, such as when the weight of a climber
21 is held by one tooth;
22 - mild steel is usually painted to present an
23 attractive appearance, but the paint is quickly
24 scratched and worn off by contact with rocks and ice,
25 resulting in rapid rusting of the crampons;

1 - putting on and taking off crampons is a time-
2 consuming business, because straps have to be done up
3 and undone, all of which can be very difficult when
4 wearing gloves or mittens in sub-zero conditions.

5

6 It is an object of the present invention to overcome
7 one or more of the aforementioned disadvantages.

8

9 According to a first aspect of the invention there is
10 provided a crampon for attachment to the sole of a boot
11 comprising at least a first plate having one or more
12 toothed portions adapted to engage in ice and
13 projecting from said plate, wherein at least one
14 projecting toothed portion comprises a pointed
15 generally planar member and a rib portion connected to
16 the planar member and extending generally perpendicular
17 thereto.

18

19 Preferably the crampon is of metal and the rib portion
20 is welded to the planar member. Preferably the rib
21 portion extends underneath the first plate, and is
22 connected thereto, preferably by welding.

23

24 Preferably the rib portion has one or more serrations
25 at its free edge. Preferably the rib portion has a
26 varying depth and tapers towards the pointed end of the
27 planar member.

28

29 Preferably the crampon is of steel, most preferably
30 stainless steel.

31

32 According to a second embodiment of the invention there
33 is provided a crampon for attachment to the sole of a
34 boot comprising a sole plate and a heel plate, at least
35 one of said sole plate and said heel plate having one
36 or more toothed portions adapted to engage in ice and

1 projecting from said plate, the crampon further
2 comprising a lever pivotally connected to one of said
3 sole plate and said heel plate and provided with
4 eccentric engaging means for engaging the other of said
5 sole plate and said heel plate.

6

7 Preferably the eccentric engaging means comprises a
8 pivoted connection.

9

10 Preferably the eccentric engaging means comprises a
11 linking member pivotally connected at a first location
12 to the lever and at a second location to the other of
13 said sole plate and said heel plate.

14

15 Preferably the length of the linking member between the
16 first and second locations is adjustable. Preferably
17 the linking member is provided with a plurality of
18 holes, through one of which a pivot member connects the
19 linking member to the other of said sole plate and said
20 heel plate. Preferably the pivot member is a
21 releasable fastening member such as a nut and bolt.

22

23 Preferably the lever is adapted to abut an abutting
24 portion of the crampon in a first closed position, such
25 that movement of the sole plate away from the heel
26 plate causes said lever to move towards said abutting
27 portion. Preferably the eccentric engaging means is
28 adapted such that movement of the lever away from said
29 abutting portion causes the sole plate first to move
30 towards the heel plate and then to move away from the
31 heel plate such that the sole of a boot may be removed
32 from said sole and heel plates.

33

34 Preferably said lever comprises a substantially planar
35 plate member. The plate member may have a handle
36 portion which projects out of the plane of the plate

1 member. Preferably the handle portion extends
2 generally perpendicular to the plane of the plate
3 member. The handle portion may be formed by twisting a
4 portion of the planar plate member.

5

6 Preferably the crampon further comprises an adjustable
7 heel clamp and/or a restraining toe bar.

8

9 While further modifications and improvements may be
10 made without departing from the scope of the invention,
11 the following is a description of a particular
12 embodiment of the invention, with reference to the
13 accompanying drawings, in which:

14

15 Fig. 1 shows a plan view on a crampon according to a
16 first aspect of the invention;

17 Fig. 2 shows a side elevation of the crampon of Fig. 1;

18 Fig. 3 is an enlarged section through line A-A of Fig.
19 2;

20 Fig. 4 is an enlarged view in the direction B on Fig.
21 1;

22 Fig. 5 shows a plan view on a crampon according to a
23 second aspect of the invention; and

24 Fig. 6 shows a side elevation of the crampon of Fig. 5.

25

26 Figs. 1 and 2 show a crampon 1 according to the
27 invention. The crampon 1 is preferably made of Type
28 304L Austenitic Stainless Steel, and is formed by
29 cutting and bending steel plate, which typically has a
30 thickness of 2 mm.

31

32 The advantages of using stainless steel are that the
33 material is extremely corrosion resistant, the plate
34 material is significantly and rapidly hardened by cold
35 working, and the crampons exhibit excellent toughness
36 and good ductility at lower temperatures. The fatigue

1 resistance increases with decreasing temperatures, and
2 precipitation hardening occurs in the austenitic
3 nuclear matrix during ageing and cold work usage.

4

5 With the obvious exception of the centre safety strap,
6 which is not shown, every component part of the crampon
7 1 is manufactured from stainless steel, resulting in a
8 high quality, corrosion free product of exceptional
9 durability and attractive polished lustre finish. The
10 finish can be restored at any time even after prolonged
11 and severe usage by simple metal polishing.

12

13 The crampon consists of a sole plate 2 and a heel plate
14 3 which are connected by a link bar 4. The sole plate
15 2 and heel plate 3 have spikes 5 which are formed by
16 bending triangular plate projections through 90°. The
17 spikes 5 provide traction in ice and snow. The sole
18 plate 2 has a toe bar 6 which engages the toe portion
19 of a climbing or walking boot. The heel plate 3 has a
20 heel clamp 7 which engages the heel portion of a boot.
21 The heel clamp 7 may be adjusted in height by means of
22 a bolt 8 which connects the heel clamp 7 to a heel
23 upstand 9 integrally formed with the heel plate 3.

24

25 The locking mechanism of the crampon 1 is of the 'over-
26 centre lock' type. Release is facilitated by pivoting
27 the handle 10a of a lever 10 away from the sole plate
28 2. When the pivot member 11, which links the lever 10
29 and link bar 4, passes the line between pivots 12 and
30 13, the sole and heel plates 2, 3 are slid apart from
31 each other and the boot is released. Pivots 12 and 13
32 may be rivet connections which allow relative rotation
33 of the connected parts. Pivot 12 connects the lever 10
34 to the sole plate 2 and passes through a slot 14 in the
35 heel plate 3. The slot 14 allows for the use of the
36 same crampon 1 with boots of different length.

1 The lever 10 consists of a plate portion 10b through
2 which pivots 11 and 12 pass and a handle 10a. The
3 handle 10a is formed by twisting a portion of the plate
4 from which the lever is made through 90°.

5
6 The procedure is reversed for fitting. The natural
7 resilience of the sole of the boot, which is in
8 compression, holds the crampon 1 itself in tension and
9 keeps the mechanism in the locked position. In the
10 locked position the handle 10a abuts an abutting
11 portion 5' of the sole plate 2. In the example shown
12 the abutting portion 5' is part of one of the teeth of
13 the crampon, but in practice it can be any part of the
14 sole plate 2. Similarly it may be another part of the
15 lever 10, and not the handle 10a, which abuts the sole
16 plate 2.

17
18 The handle 10a may be operated even when wearing
19 mittens or gloves, a vital requirement at high
20 altitudes and low temperatures. The link bar 4 has
21 several holes 15 drilled in it to allow for accurate
22 fit of different boot sizes. The nut and locking bolt
23 of pivot 13 allow relative rotation of the link bar 4
24 and the heel plate 3. In use the nut and locking bolt
25 13 are only undone when the crampon is used on boots of
26 a different size. It is not necessary to undo the bolt
27 13 when taking the crampon on and off.

28
29 An optional centre safety strap (not shown) secures the
30 instep of the boot firmly down onto the crampon 1, a
31 particularly important feature when using leather as
32 opposed to plastic boots, and also acts as a secondary
33 security device to ensure the handle is kept in the
34 locking position under heavy impact, since the strap
35 passes around the dogleg portion 16 of the handle 10 to
36 hold it in contact with the sole plate 2. Fig. 4 shows

1 the retaining slot 17 formed in a flange 18 on the
2 underside of the sole plate 2. The flange is formed by
3 bending a rectangular projecting portion of the sole
4 plate 2 through 90°. The strap is passed through and
5 held by the retaining slot 17.

6
7 The heel clamp 7 is height adjustable for varying boot
8 sole thicknesses. The heel clamp 7 is fastened to the
9 projecting rearward flange 9 of the heel plate 3 by
10 means of a fastening bolt and locking nut 8. The
11 flange 9 may be provided with a number of holes or a
12 slot to allow for adjustment of the height of the heel
13 clamp 7. It is not necessary to undo the bolt 8 when
14 taking the crampons off. It is only necessary to undo
15 the bolt when adjusting the crampon 1 for use with
16 boots having a different sole thickness.

17
18 Fig. 3 shows the T-shaped front tooth 19 which ensures
19 maximum grip on high-angle or vertical faces. The
20 vertical serrated teeth 21 are formed in a web 20 which
21 is seam welded to the tooth 19 by a stainless wire-
22 spool method using inert argon gas as the weld shield.
23 Pre-heating and post-weld cooling enhance the natural
24 precipitation hardening qualities of the steel in the
25 area of the toe teeth resulting in a strong and
26 resilient structure able to withstand the most
27 strenuous abuse and impact.

28
29 The sole plate 2 is provided with a cutout hole 21 to
30 reduce weight. Similarly the heel plate 3 is provided
31 with two cutout holes 22 to reduce weight. Upstands
32 23, formed by bending projecting portions of the heel
33 plate through 90°, hold the heel of a boot centrally in
34 the heel plate 3.

35
36 Referring now to Figs. 5 and 6, the same reference

1 signs are used to denote the same components as shown
2 in Figs 1 and 2. The vertical webs 30 of the front
3 teeth 19 extend along the length of the sole plate 2,
4 improving stiffness of the sole plate 2, and serving as
5 guide walls for the neck portion 34 of the heel plate
6 3. The planar nature of the webs 30 makes them easier
7 to fabricate. The slots 17 for the strap (not shown)
8 are formed in lateral portions 31 of the sole plate
9 itself 2. Both the sole plate 2 and heel plate 3 are
10 provided with a large number of small holes 32, 33 to
11 reduce weight.

12

13 The high build quality and material suitability and
14 integrity result in a product with a prolonged life
15 span and inherently good safety features to satisfy the
16 needs of the most demanding climbers.

17

18 The T-shaped section of the front teeth 19 has a high
19 inertia and gives improved bending resistance, making
20 the teeth 19 less likely to snap off under extreme
21 load.

22

23 One crampon 1 can fit a range of boot sizes, but the
24 fitting and release operation remains simple, being
25 accomplished by moving one lever 10. Fitting and
26 release can therefore be accomplished while wearing
27 mittens or gloves.

28

29 Accidental operation of the lever 10 can be prevented
30 by a single strap which also serves to hold the instep
31 of the boot firmly down onto the crampon. A strap with
32 an easily operable release mechanism may be chosen, so
33 that the crampon is still quickly and easily releasable
34 from the boot.

35

36 Although in the illustrated embodiments the lever 10 is

1 pivotally connected to the sole plate 2, while the link
2 bar 4 is pivotally connected to the heel plate 3, it is
3 possible and equally effective to arrange the eccentric
4 connection such that the lever 10 is pivotally
5 connected to the heel plate 3, and the link bar 4 is
6 pivotally connected to the sole plate 2. The slot 14
7 would then be provided in the sole plate 2, which would
8 fit beneath the heel plate 3.

9
10 These and other modifications and improvements can be
11 incorporated without departing from the scope of the
12 invention.

1 **CLAIMS**

2

3 1. A crampon (1) for attachment to the sole of a boot
4 comprising a sole plate (2) and a heel plate (3),
5 at least one of said sole plate and said heel
6 plate having one or more toothed portions (5)
7 adapted to engage in ice and projecting from said
8 plate (2, 3), the crampon further comprising a
9 lever (10) pivotally connected to one of said sole
10 plate and said heel plate and provided with
11 eccentric engaging means (4, 11, 13) for engaging
12 the other of said sole plate and said heel plate.

13

14 2. A crampon according to Claim 1 wherein the
15 eccentric engaging means comprises a linking
16 member (4) pivotally connected at a first location
17 (11) to the lever (10) and at a second location
18 (13) to the other of said sole plate and said heel
19 plate.

20

21 3. A crampon according to Claim 2 wherein the length
22 of the linking member (4) between the first and
23 second locations is adjustable.

24

25 4. A crampon according to Claim 3 wherein the linking
26 member (4) is provided with a plurality of holes
27 (15), through one of which a pivot member (13)
28 connects the linking member to the other of said
29 sole plate and said heel plate.

30

31 5. A crampon according to Claim 4 wherein the pivot
32 member (13) is a releasable fastening member such
33 as a nut and bolt.

34

35 6. A crampon according to any of Claims 1 to 5
36 wherein the lever (10) is adapted to abut an

1 abutting portion (5') of the crampon in a first
2 closed position, such that movement of the sole
3 plate (2) away from the heel plate (3) causes said
4 lever (10) to move towards said abutting portion
5 (5').
6

7 7. A crampon according to any of Claims 1 to 6
8 wherein the eccentric engaging means is adapted
9 such that movement of the lever (10) away from
10 said abutting portion (5') causes the sole plate
11 (2) first to move towards the heel plate (3) and
12 then to move away from the heel plate (3) such
13 that the sole of a boot may be removed from said
14 sole and heel plates.
15

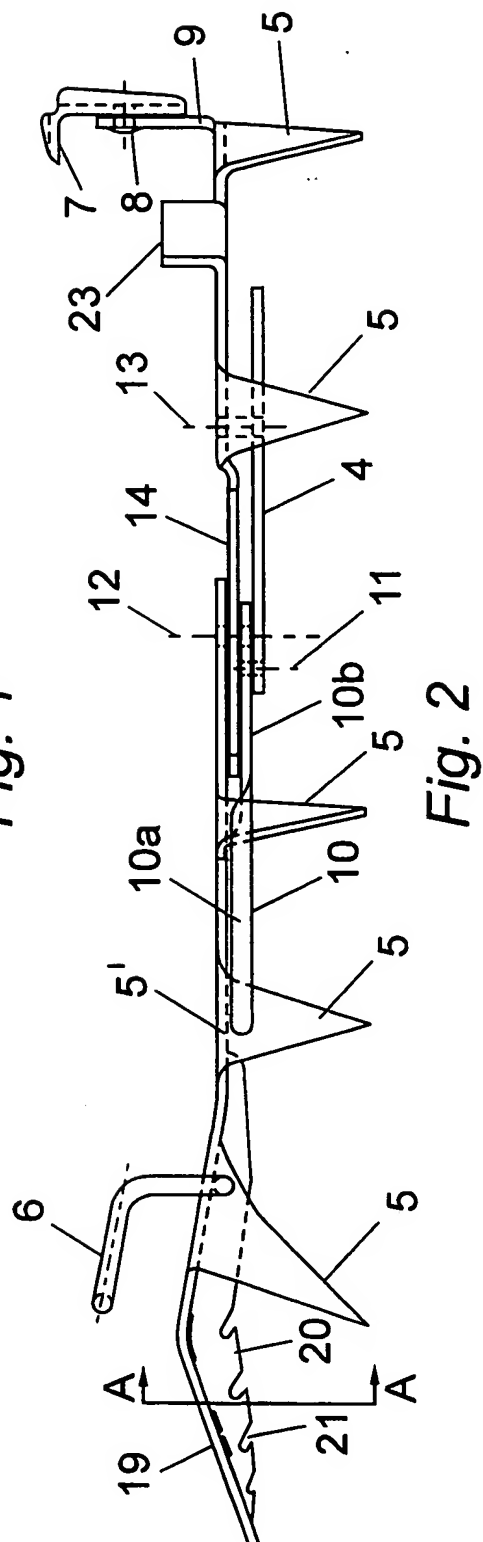
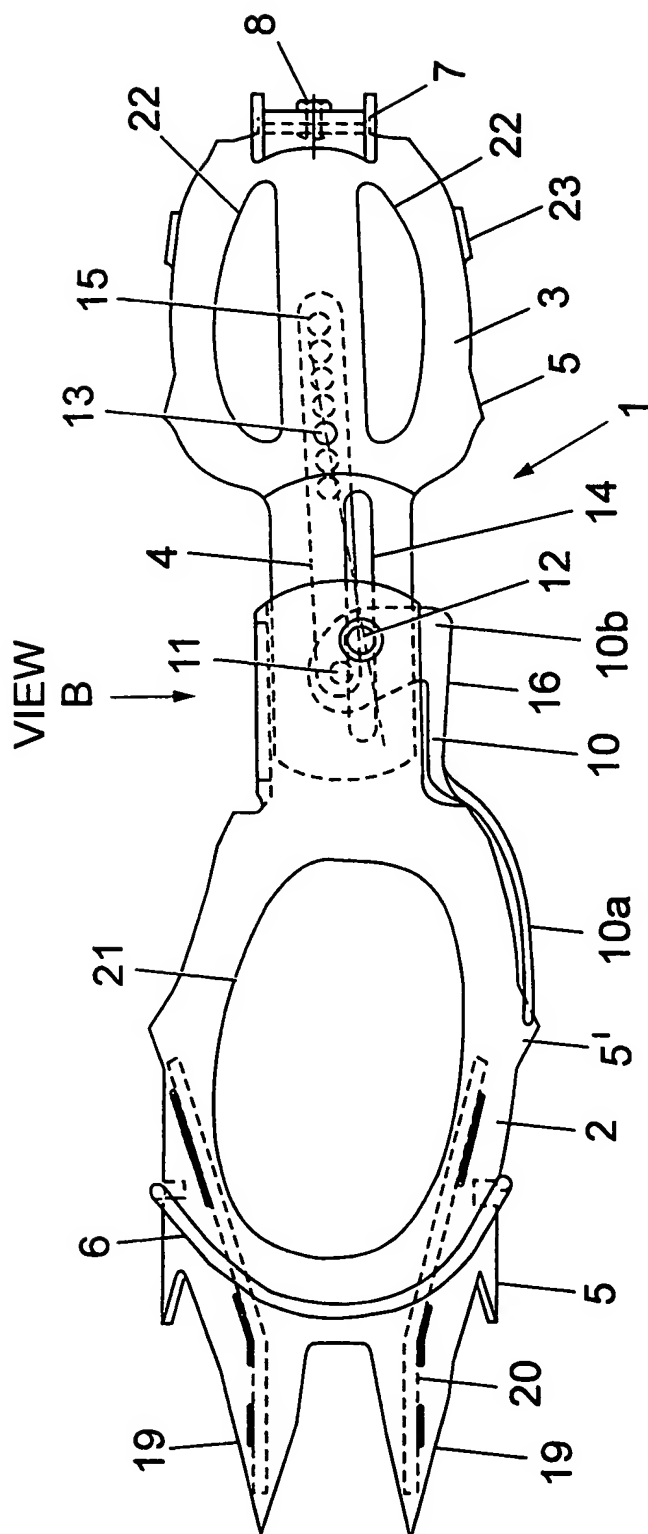
16 8. A crampon according to any of Claims 1 to 7
17 wherein said lever (10) comprises a substantially
18 planar plate member (10b) and a handle portion
19 (10a) which extends generally perpendicular to the
20 plane of the plate member (10b).
21

22 9. A crampon according to any of Claims 1 to 8
23 wherein the crampon further comprises an
24 adjustable heel clamp (7) and/or a restraining toe
25 bar (6).
26

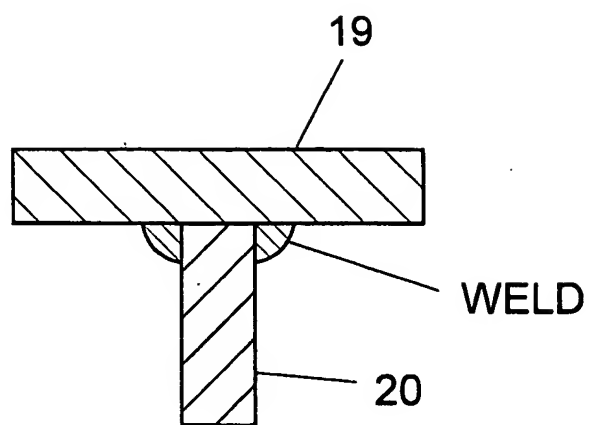
27 10. A crampon according to any of Claims 1 to 9
28 wherein at least one of said projecting toothed
29 portions comprises a pointed generally planar
30 member (19) and a rib portion (20, 30) connected
31 to the planar member and extending generally
32 perpendicular thereto.
33

34 11. A crampon for attachment to the sole of a boot
35 comprising at least a first plate (2, 3) having
36 one or more toothed portions (5) adapted to engage

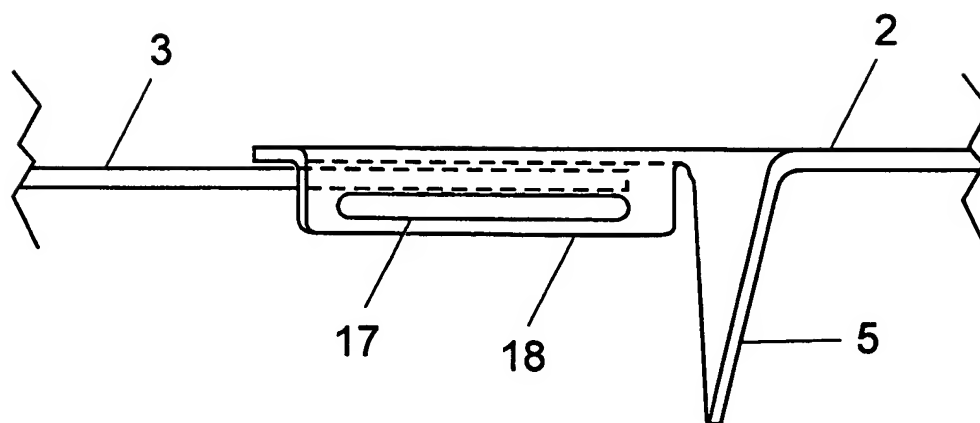
- 1 in ice and projecting from said plate, wherein at
2 least one projecting toothed portion comprises a
3 pointed generally planar member (19) and a rib
4 portion (20, 30) connected to the planar member
5 and extending generally perpendicular thereto.
6
- 7 12. A crampon according to one of Claims 10 and 11
8 wherein the crampon (1) is of metal and the rib
9 portion (20, 30) is welded to the planar member
10 (19).
11
- 12 13. A crampon according to one of Claims 10 to 12
13 wherein the rib portion (20, 30) extends
14 underneath the first plate (2, 3), and is
15 connected thereto.
16
- 17 14. A crampon according one of Claims 10 to 13 wherein
18 the rib portion (20, 30) has one or more
19 serrations (21, 31) at its free edge.
20
- 21 15. A crampon according to one of Claims 10 to 14
22 wherein the rib portion (20, 30) has a varying
23 depth and tapers towards the pointed end of the
24 planar member (19).



2 / 3



SECTION A-A

Fig. 3

SECTION B-B

Fig. 4

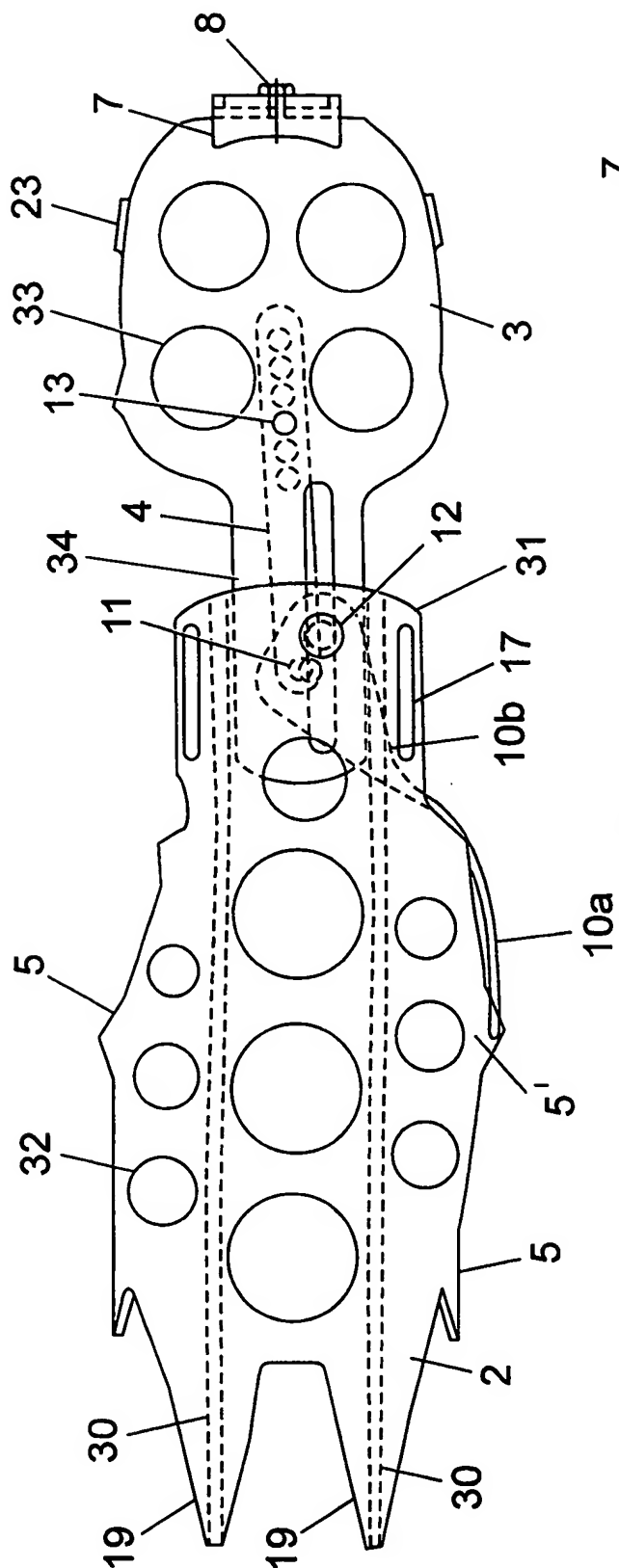


Fig. 5

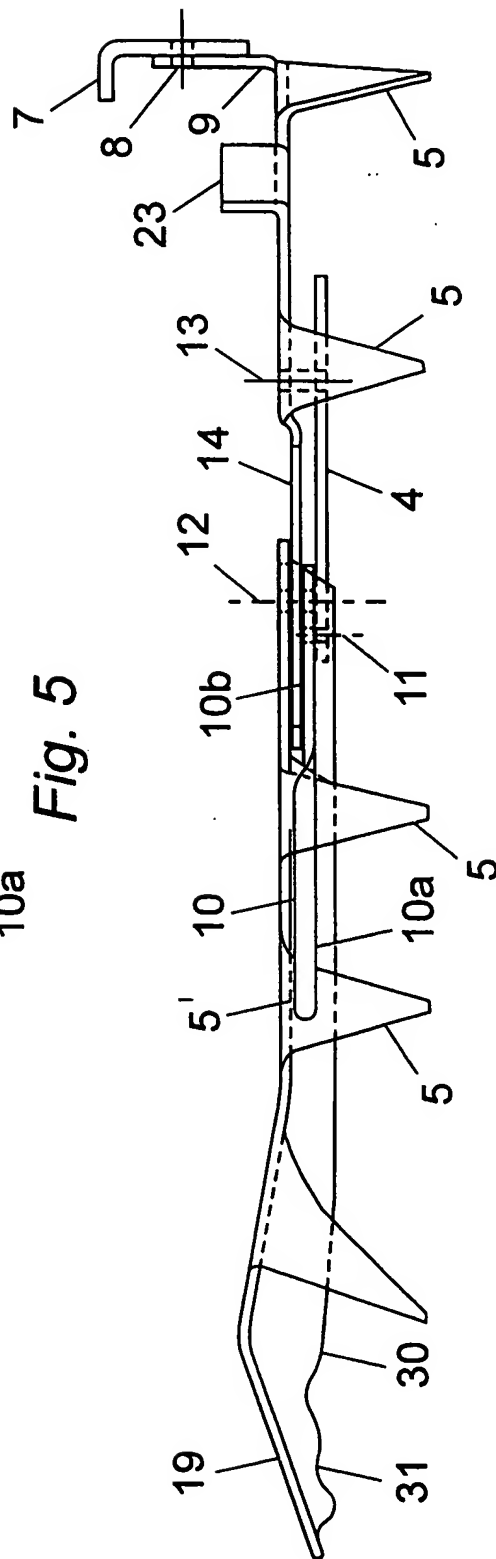


Fig. 6

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 98/00549

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A43C15/06

According to International Patent Classification(IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A43C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2 570 258 A (L. SIMON) 21 March 1986 see the whole document ---	1, 11
A	FR 2 080 348 A (RATTI E PIAZZA) 12 November 1971 see the whole document ---	1, 11
A	FR 2 106 932 A (ETS. C. SIMOND) 5 May 1972 see the whole document ---	1, 11
A	FR 2 285 093 A (USINES LAPRADE) 16 April 1976 see the whole document ---	1, 11
A	FR 2 521 838 A (P. GABARROU) 26 August 1983 see the whole document -----	1, 11

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☒ Patent family members are listed in annex.

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